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ARCOS BULLITEN 2012-3

SUBJECT: IT Design

1. REFERENCE:
   a. Army Reserve IT Manual, Change 3

   b. Army Reserve Design Process Submittal Requirements (DPSR)

   c. USARC G-2/6 IT Design Whitepaper, 26 Jun 2012 (ENCLOSURE 1)

2. This memorandum is to serve as updated guidance currently defined in Army Reserve IT Manual, Change 3, and the Army Reserve DPSR. The attached whitepaper has been prepared and approved by USARC G-2/6 and provides updates applicable to the design of Army Reserve Facilities.

3. The whitepaper represents recent lessons learned and frequent IT design issues and omissions. This document will be incorporated into future updates of the Army Reserve IT Manual and DPSR and is intended to be utilized as interim requirements until those updates occur.

4. This ARCOS Bulletin supersedes ARCOS Bulletin 2012-1. All applicable criteria from that bulletin has been incorporated into the attached whitepaper dated 26 Jun 2012.

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USARC G-2/6 IT Design Whitepaper

Last Updated: 26 June 2012

This whitepaper has been designed to be used as a tool in the creation and review of the Telecommunications Narrative and Design for all Army Reserve MILCON projects. This document is a bridging document that describes lessons learned and/or frequent or typical IT design issues. It will be periodically updated until the next major revision of the Army Reserve IT Manual is issued.

IT Reference Documents

The Telecommunications Design and Construction for all MILCON projects follow basic industry standards and are fully compliant with standards established by the Army Reserve, ISEC and the Corps of Engineers.

In addition to the industry standard telecommunications references that are included in the Design Narrative, the following IT Reference Document titles are to be incorporated in the Design Narrative Electrical and Telecommunications sections as required Reference Documents.

1. Army Reserve IT Manual
2. Technical Criteria for the Installation Information Infrastructure Architecture (I3A)
3. UFC 4-171-05

All references to UFC 3-580-1 as it pertains to Telecommunications must be removed from the Design Narrative as that UFC is obsolete for all Army Reserve MILCON projects (Per I3A ALARACT Dated February 2010).

IT Design Pitfalls

USARC G-2/6 has identified several design deficiencies that have occurred on a majority of the Telecommunications Designs reviewed. In order to avoid these IT design pitfalls, a description of the item and method of avoiding the design error are listed below;

- **Pitfall:** No RCDD stamp on the Certified Final Telecommunications Design Package.
    - **Suggested Avoidance Method:** IAW I3A and the Army Reserve IT Manual, RCDD review, approval, certification, and stamp of telecommunications design before issuing Certified Final is required.
- **Pitfall:** Voice and Data outlet termination "serving areas" are not clearly defined on telecommunications drawings.
    - **Suggested Avoidance Method:** IAW I3A, in buildings with the TER and TR or multiple TRs on the same floor, each telecommunications floor plan sheet (i.e. 1T-XXX) should clearly indicate the TER/TR the voice and data outlets are to be terminated in. For example, a General Note which states, "All voice/data outlets on this sheet are to be terminated in TR 129)" could be added to each applicable sheet.
- **Pitfall:** Water, Gas, and Mechanical pipes that don't serve the EF, TER, and TR(s) are often designed to pass thru or above these spaces.
    - **Suggested Avoidance Method:** IAW the Army Reserve IT Manual, this is not allowed. To help avoid this issue, G-2/6 suggests adding the following General Note to the Fire Safety, Plumbing, and Mechanical drawings general notes pages: Equipment (piping, ductwork, machinery, etc) that does not serve the EF, TER, or TR(s) shall not be installed above or in these IT spaces nor will this equipment pass through or enter the EF, TER, or TR(s). In addition to adding this note, this is an important item for the Designer to be mindful of as the Fire Safety, Plumbing, and Mechanical designs are created.
- **Pitfall:** Motors, transformers, or other electrical devices greater than 5KVA are located within 47" of Category 6 horizontal cabling and/or copper backbone cabling. This can often cause an EMI issue. EMI issues are very difficult to isolate and often expensive to repair. That is why the BISCI TDMM 12th Edition recommends avoiding all possible EMI situations.
    - **Suggested Avoidance Method:** To avoid the possibility of EMI, add the following General Note to the Mechanical and Electrical drawings general notes pages: Any motor, transformer, or other electrical device greater than 5KVA will have a minimum of a 47" buffer from any wall of the EF, TER, or TR(s). In addition to adding this note, this is an important item for the Designer to be mindful of as the Mechanical and Electrical designs are created.

IT Design Changes and New IT Design Items

The following are updates to the latest version of the Army Reserve IT Manual, IT community changes and new IT Design methods/requirements of note;

- Army Reserve data cable jacket and outlet jack color are now blue. G-2/6 requests this item be added as a General note on the Telecommunications General notes sheet. G-2/6 also requests that a General note be added to indicate that white is the required Army Reserve cable jacket and jack color for voice outlets.
- The required size and specifications for IT wall-mounted cabinets have changed. The new requirement is that the cabinet be 24"W, 24"H, and 30"D (12 RU high), lockable, with louvers and fan. G-2/6 requests that a Keynote be added to the design to indicate this requirement when IT cabinets are used in the design (i.e. SIPRNet Café).
- Copper and fiber patch cables are now GFGI items and do not need to be included in the Telecommunications Design Narrative or the Telecommunications Design.
- Wireless Access Point Outlet infrastructure is now required to be included in the Telecommunications Design.
    - Provide Wireless Access Point outlets for the following areas;
        - Training Building
            - Classrooms
            - Assembly Hall
            - Conference Rooms
            - Library
            - Learning Center
        - OMS/VMS/TEMF
            - Workbay
    - Coverage and Outlet Density Requirements
        - 1 Wireless Access Point outlet is required for every 55 foot x 55 foot square grid of the above areas.
        - If grid location will support less than 20 users, then provide one Cat6 cable per outlet. For grid locations with over 20 users, provide two (2) Cat6 cables per outlet.
    - Mounting Details
        - For all standard height drop ceiling locations, each Wireless Access Point outlet should be mounted 12 inches above finished ceiling.
        - For all Assembly Halls and Work Bays, each Wireless Access Point outlet should be mounted on the wall at 12 feet AFF.
- Electrical Outlet requirements for the EF, TER, and TR(s) have been significantly revised. The changes are as follows;
    - Clean Power circuits are no longer required.
    - The electrical panel for the EF, TER, and TR(s) must be located in the space that it serves.

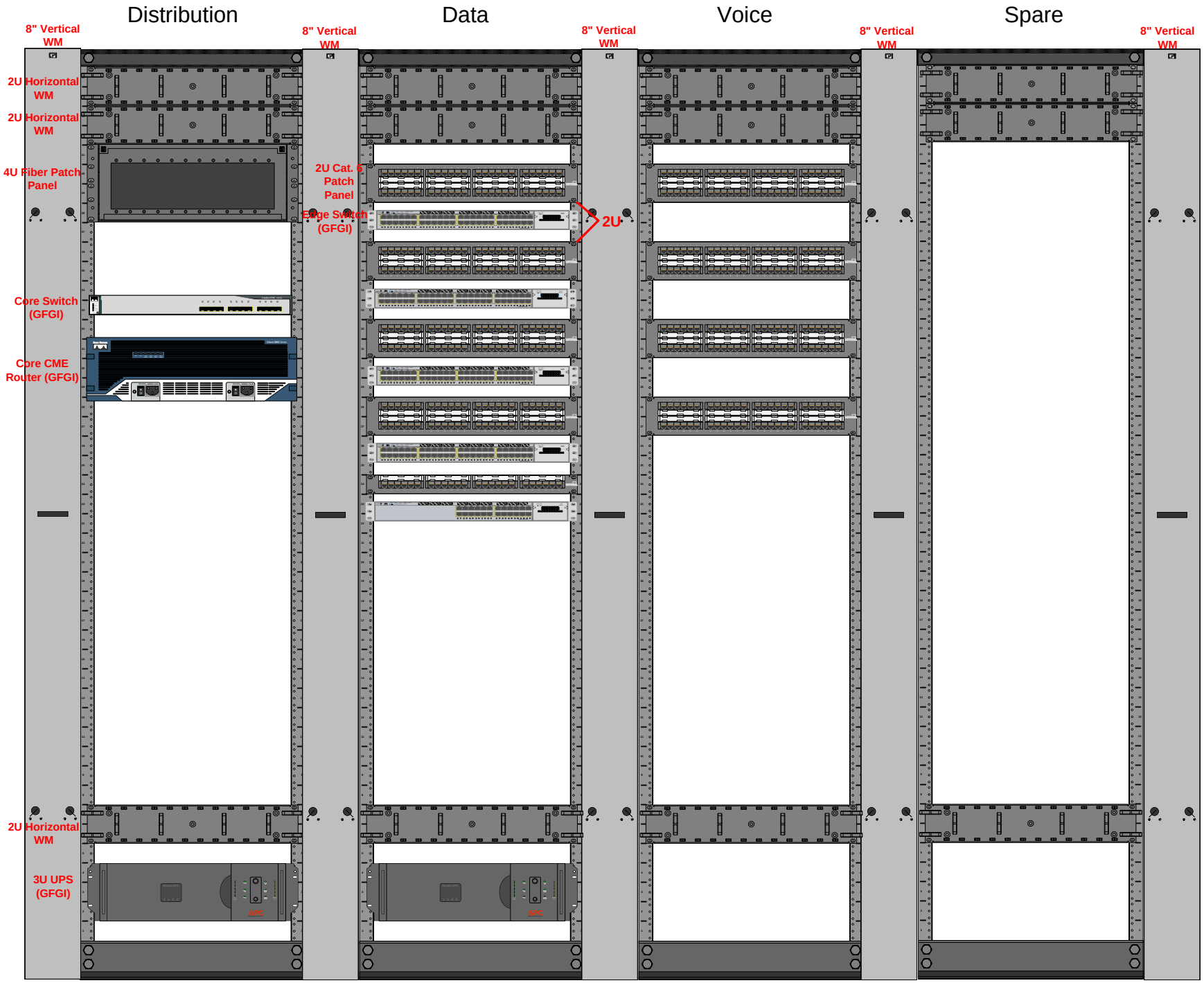
    - Entrance Facility – New requirements call for two dedicated 120V/20 Amp circuits with one NEMA L5-20 and one double duplex NEMA 5-20 receptacle. These receptacles will be installed on the plywood backboard at 18" AFF near the Service Provider Conduits.
    - TER and all TR(s) - New requirements call for one dedicated 120V/20 Amp circuit with one double duplex NEMA 5-20 receptacle for each 19 inch (480 mm) rack or cabinet in the TER and all TR(s). This receptacle shall be installed 15" AFF on the rear of the rack.
- HVAC requirements for the TER and TR(s) have also been revised. The following is provided as additional guidance to help the HVAC Designer meet the requirements as listed in the Army Reserve IT Manual and I3A;
    - For heat load calculations use the heat dissipation information from the actual equipment to be installed in each rack. This information should be coordinated with the USARC G2/6 representative for the project. If it is determined this information is not available then 1650 Watts per IT rack should be used as a default value.
- IAW the BICSI TDMM and general manufacturer's specifications, the Army Reserve now requires the following to used for Category horizontal cabling conduit runs from the outlet box to the accessible ceiling space, cable tray, or TER/TR;
    - All horizontal cabling runs containing 4 or less Category 6 cables must use a 1" minimum EMT conduit.
    - All horizontal cabling runs containing 5-6 Category 6 cables must use a 1.25" minimum EMT conduit.
    - Poke-thru floor boxes for modular furniture system connections (up to 6 workstations) must have 1-2" conduit from the box to the accessible ceiling space, cable tray, or TER/TR.
    - All other horizontal cabling runs containing 7 or more Category 6 cables must be sized for an initial fill ratio of 40% or less. This 40% fill ratio must be based on a Category 6 cable diameter of .29".
- In-Slab Floor Box and Conduit Guidelines
    - IAW I3A, all in-slab floor box locations require that 2 conduits (**one in-use and one spare**) be installed. Only the first conduit can have cable installed. The second must remain empty.
    - IAW the Army Reserve IT Manual and the BISCI TDMM, the Category 6 cable installed in all in-slab conduits must be rated for wet locations. Category 6 Indoor/Outdoor type cable must be specified for these locations.
- Conduit requirements from the TER to the UHS have been reduced. Only 1-4" conduit with 3-1.25" innerduct is now required.
- Cable requirements from the TER to the UHS have been reduced. Only 25 pair of OSP copper cable is now required with no requirement for Fiber Optic cable.
- All IDS System Panel locations will now require a voice/data outlet from the IDS system panel to the nearest TER/TR. This voice/data outlet must be installed in 1" conduit.

- Vertical Rack Grounding Bus-bars as defined in section 3.7.2.3 of the Army Reserve IT Manual are no longer required. All IT racks should now be grounded directly the TGB using a #6 AWG copper wire.
- GPON as defined in section 3.2.7 of the Army Reserve IT Manual should no longer be considered as an IT design alternative and this section is no longer applicable to Army Reserve MILCON projects.

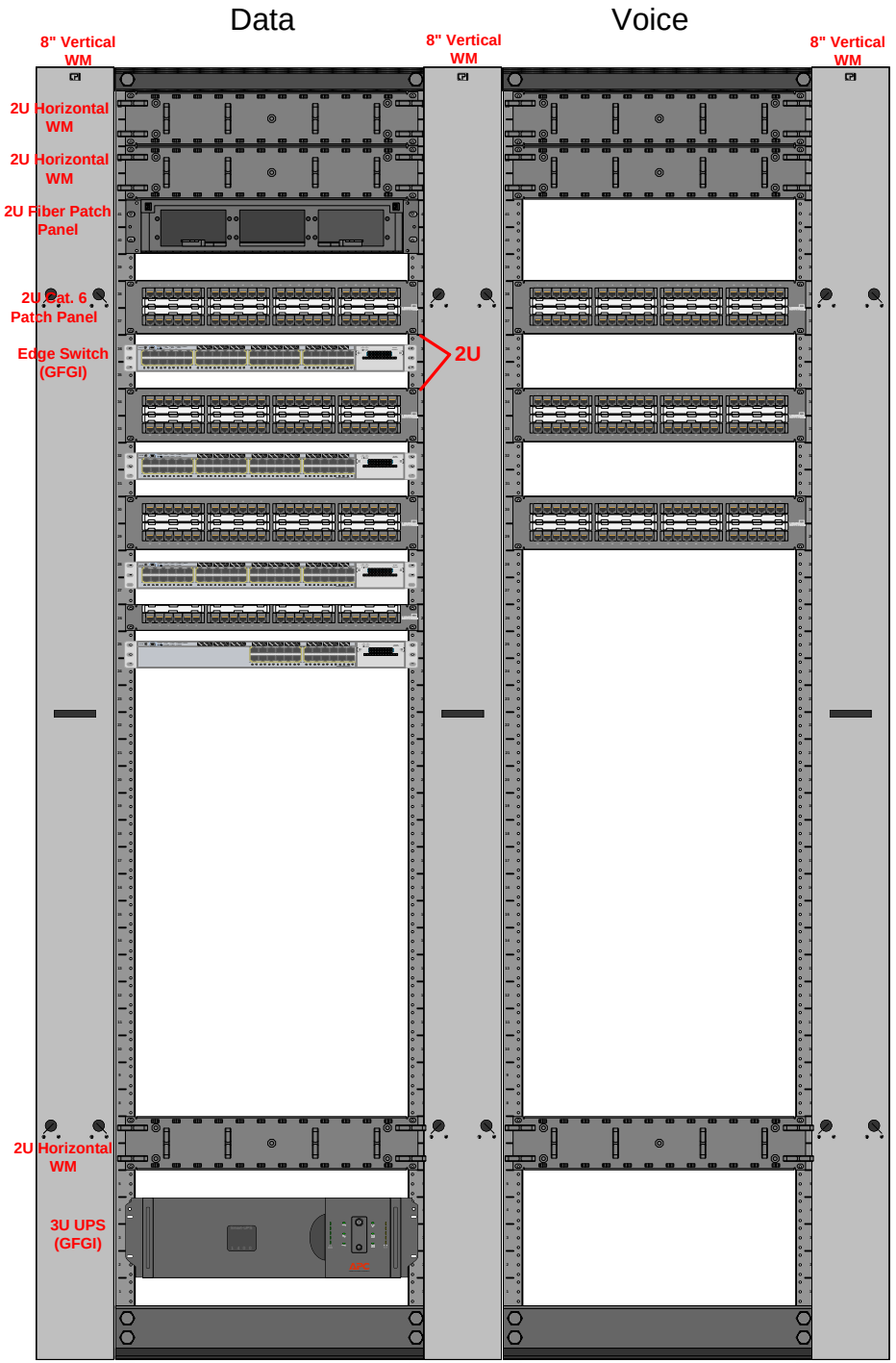
Helpful Diagrams

- The following pages contain diagrams of the Typical IT Rack Design for the TER, TR(s), and the OMS TR. There is also a Typical Army Reserve IT Backbone Cabling Diagram. These diagrams are designed to assist the Telecommunications Designer in their design of the Rack Elevation drawings, Telecommunications Site Plan, and Riser (One-Line) diagram.

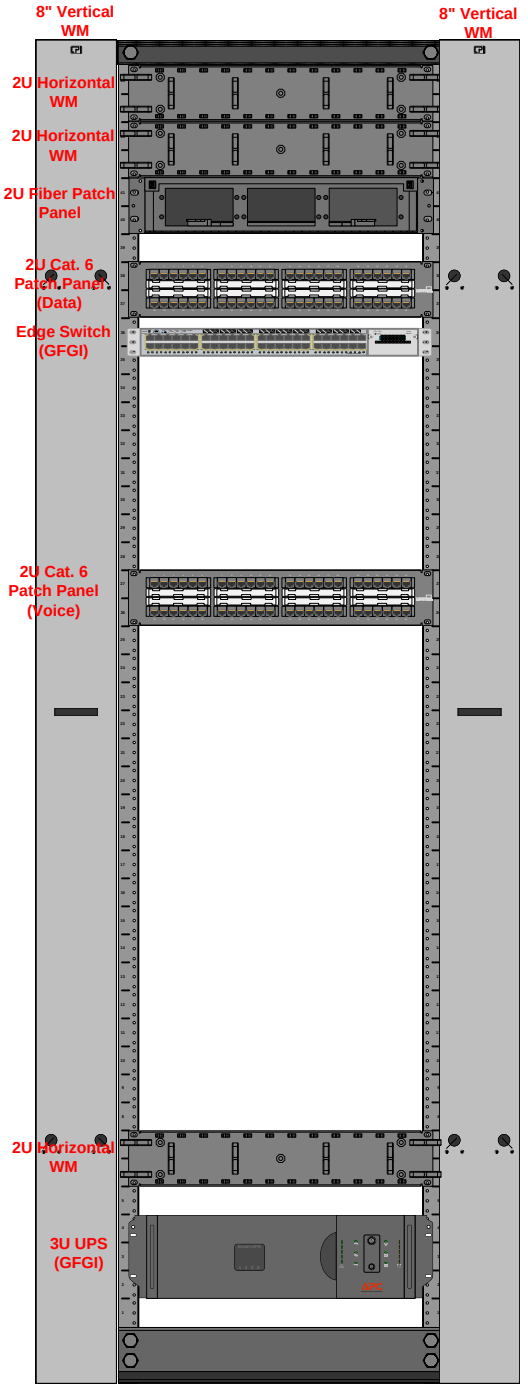
TER IT Racks (Typical)



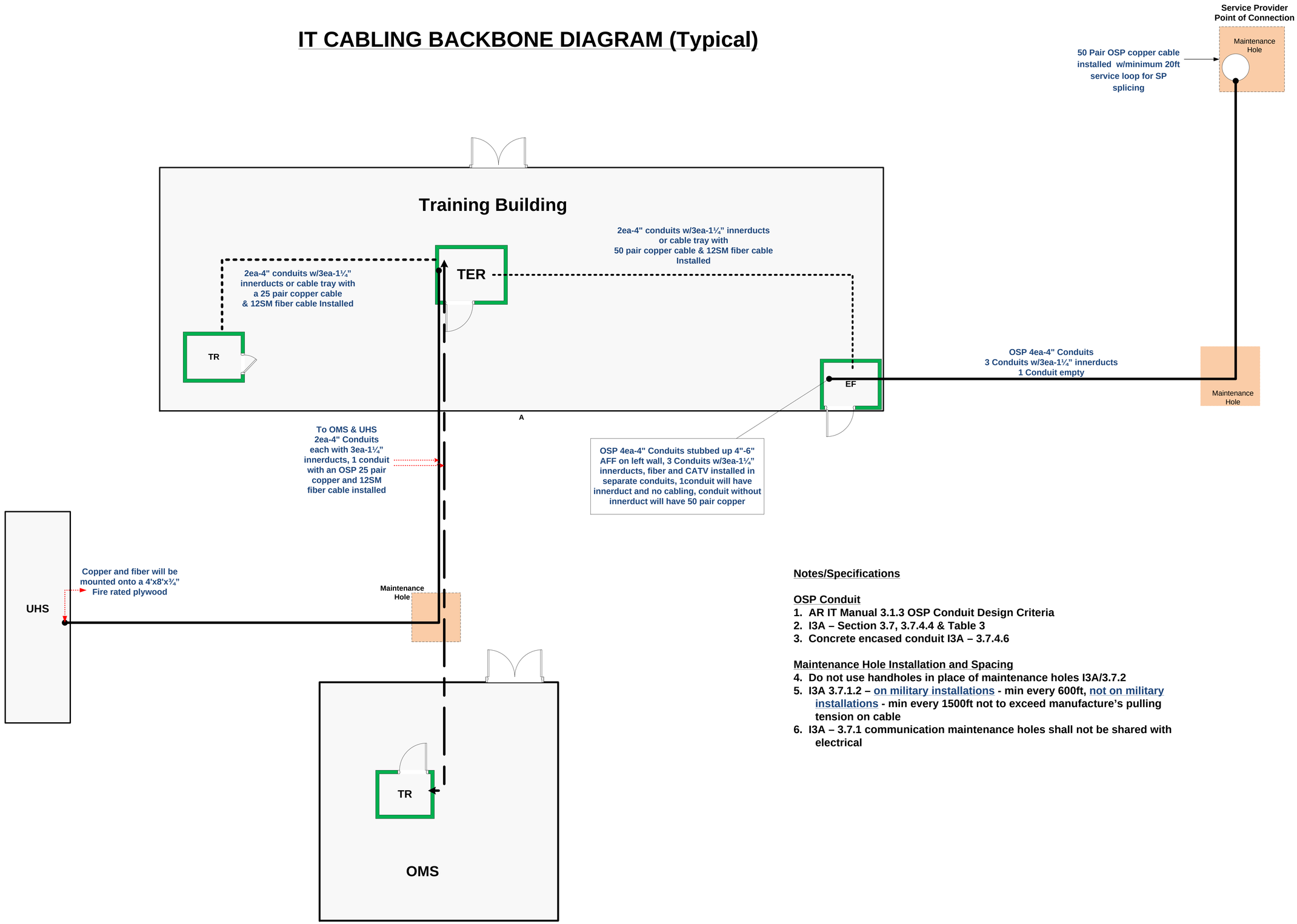
TR IT Racks (Typical)



OMS TR IT Rack (Typical)



IT CABLING BACKBONE DIAGRAM (Typical)



Notes/Specifications

OSP Conduit

1. AR IT Manual 3.1.3 OSP Conduit Design Criteria
2. I3A – Section 3.7, 3.7.4.4 & Table 3
3. Concrete encased conduit I3A – 3.7.4.6

Maintenance Hole Installation and Spacing

4. Do not use handholes in place of maintenance holes I3A/3.7.2
5. I3A 3.7.1.2 – on military installations - min every 600ft, not on military installations - min every 1500ft not to exceed manufacture's pulling tension on cable
6. I3A – 3.7.1 communication maintenance holes shall not be shared with electrical